

National Climatic Data Center

DATA DOCUMENTATION

FOR

**DATASET 6420d (DSI-6420d)**

NOAA Research Flight Data (AOC)

DATASET WP-3D NOAA-42 GHOSTNET EXPERIMENT 2005

**May 2, 2006**

National Climatic Data Center  
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## 1. Abstract

NOAA's Aircraft Operations Center (AOC) maintains and operates two WP-3D aircraft for weather research projects throughout the year. Examples of these projects are hurricanes, thunderstorms, atmospheric chemistry and winter weather missions. Each of these projects consists of a series of individual flights. For instance, during hurricane projects the WP-3D may fly a variety of missions through tropical cyclones.

The real-time flight-level data is collected and written to a digital data tape on the aircraft and afterwards converted to a file for faster processing and archiving. For each archived project, there are multiple directories consisting of individual flights. The data in these flight directories contain real-time measurements obtained from sensors located throughout the aircraft's interior and exterior. Also included in a flight directory are scanned images of the actual flight manifest, the navigation log and the mission observation log.

## 2. Element Names and Definitions

A data record contains 220 elements, stored as 16 bit integer words, and must undergo a conversion process to be displayed as engineering units (degrees, millibars, etc). All of the navigation data is stored as two 16 bit integer words that can only be discerned through special bit shifting operations. If examination of the navigation data is desired, contact AOC for a copy of the bit shifting software.

The flight-level data file contains measurements at one-second intervals. These include time in UTC (Z), Global Positioning System (GPS) and inertial navigation data, altitudes, and a variety of temperature and pressure observations. Depending on the scientific objectives of a project, instrumentation will either be included or excluded from this list.

NOAA-42 Aircraft N42RF Ghostnet Experiment 2005

### Array

Location	Description
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1	Setup	MS Byte - Slow tape ID, LS Byte - Acft #
2	Setup	size of slow tape logical record == 220 words
3-8	Setup	Micro 99 time - yr,mo,da,hr,mn,sc; updated by fast
9-11	Fast	TBG 1 time - hr,min,sec; binary (not BCD)
12-14	Fast	TBG 2 time -same as TBG 1
15-17	GPS_Time Fast	Collins GPS Time of fix - hr,min,sec; same as TBG's
18-19	GPS_Dat Fast	Collins GPS Altitude - MS bit = -102400*32 ft
20-21	Fast	Collins GPS Latitude - MS bit = -PI*4 radians
22-23	Fast	Collins GPS Longitude - MS bit = -PI*4 radians
24-25	Fast	Collins GPS GPS North Vel. - MS bit = -1638.4*2 knots
26-27	Fast	Collins GPS GPS East Vel. - MS bit = -1638.4*2 knots
28-29	Fast	Collins GPS Vert. Vel. - MS bit = -2048*2 ft/sec
30	Fast	BR2G GPS Data Time; 0 to 3600, lsb = 1/100 sec
31	Fast	BR2G GPS Altitude; +/- 32767, lsb = 1 ft
32-33	Fast	BR2G GPS Latitude; msb = -PI*4 radians
34-35	Fast	BR2G GPS Longitude; msb = -PI*4 radians

36	Fast	BR2G GPS Status and Horiz. Dilution of Precision bits 15,14: 00 - no position, 01 - uncorrected, 10 - diff corrected, 11 - almanac used bits 13-8: # of satellites used ls byte - HDOP 00 to 99
37	Spare	
38	Fast	Collins GPS North Accel. - MS bit = -128 m/s**2
39	Fast	Collins GPS East Accel. - MS bit = -128 m/s**s
40	Fast	Collins GPS Vert. Accel. - MS bit = -128 m/s**2
41	Fast	Collins GPS Chan 1 Status 1 \ See Rcvr 3M Spec. for
42	Fast	Collins GPS Chan 1 Status 2 / bit assignments
43-50	Fast	Collins GPS Chan 2-5 Status - same format as Chan 1
51	Fast	Collins GPS Figure of Merit word - See Rcvr 3M spec.
<p>Note: Time FOM from word 64 is in reserved bits (12,11,5,4 in HP notation; 3,4,10,11 in Collins Notation)</p>		
52	Fast	Collins GPS expected horiz. error - LS bit = 1 meter
53	Fast	Collins GPS expected vert. error - LS bit = 1 meter
54	Spare	
55-56	Fast	INE 1 Altitude - MS bit = -102400*32 ft
57-58	Fast	INE 1 Latitude - MS bit = -PI*4 radians
59-60	Fast	INE 1 Longitude - MS bit = -PI*4 radians
61-62	Fast	INE 1 North Vel. - MS bit = -1638.4*2 knots
63-64	Fast	INE 1 East Vel. - MS bit = -1638.4*2 knots
65-66	Fast	INE 1 Vert. Speed - MS bit = -2048*2 ft/sec
67-68	Fast	INE 1 Drift Angle - MS bit = -PI*4 radians
69-70	Fast	INE 1 Heading - MS bit = -PI*4 radians
71-72	Fast	INE 1 Pitch Angle - MS bit = -PI*4 radians
73-74	Fast	INE 1 Roll Angle - MS bit = -PI*4 radians
75-94	Fast	INE 2 Data - same as INE 1
95	Fast	APN-232 RA Data in meters; 1 sec avg
96	Fast	Spare; 1 sec avg
97	Fast	Spare; 1 sec avg
98	Fast	APN-159 RA synchro data in meters; 1 sec avg
99	Fast	APN-159 RA parallel encoder data in meters
100	INEflg Fast	# of INE bursts avg'd this sec; ms byte - INE #1 ls byte - INE #2
101	GPSflg Fast	GPS & APN232 RA burst count; ms-nyble - GPS lat/lon/alt burst count, 2 <sup>nd</sup> nyble- GPS velocity east/north/vert burst count, LS byte - APN232 RA number of words averaged this second
102	GarFlg Fast	# of ISEC word 96 & 97 samples avg'd this sec; ms byte - ISEC(96), ls byte - ISEC(97)
103	Dig_Err Fast	Error flags for Dig. Avg.; bit 0 for APN232, etc.
104	Spare	
105	ADCstatus ASSRV	ADC unit status - from ADC slow data burst
106	IAUstatus Fast	IAU unit status - from IAU burst
107	OperSel Slow	Operator selections: ms nybl - temp probe, nybl 2 - nav. unit, nybl 3 - Alt. source ls nybl - dewpoint unit
108	Fast	status from Wing Wiring Junction Box
109	Fast	status from Cloud Physics Station

110	Fast	status from Flight Director Station
111	Fast	spare
112	Fast	event switch data - Nav,Sta1,Sta2,Sta3
113	Fast	event switch data - Nrack,Sta5,C3X,Sta7
114	Fast	event switch data - F/D,Pilot
115-138	Fast	Spare
139	Fast	M99 10 mSec tic when time was read - use for clock drift tracking
140		J-W Liquid water
141		RMST TOTAL TEMP #1
142		RMST TOTAL TEMP #2
143		Dew Point 1 (DW1) GENERAL EASTERN
144		AP Alpha (attack) Pressure
145		DAP Differential Alpha Pressure
146		BP Beta (slip) Pressure
147		DBP Differential Beta (slip) pressure
148		PSW Rosemount static pressure from wingtip(#1281)
149		PQW Rosemount dynamic pressure from win#tip(#1281)
150		RD Radiometer Down measures SST (PRT-5)
151		Spare
152		Spare
153		Spare
154		Vertical Acceleration 2
155		Vertical Acceleration 1
156		RADOME ATTACK PRESSURE
157		RADOME SIDESLIP PRESSURE
158		RADOME DIFF. PRESSURE (RPQ)
159		RADOME IMPACT PRESSURE
160		Total Temp #3 (fast response) Port side
161-163		Spare
164		DEWPOINT #2 (DW2) EDGETECH
165		Spare
166		Spare
167		Dewpoint #3 (DW3) EDGETECH
168		WVSS
169-170		Spare
171		King Liquid water
172		PSF - COPILOT ROSEMOUNT #1281 (FUSELAGE)
173		PQF1 - COPILOT ROSEMOUNT #1281 (FUSELAGE)
174		PQF2 - COPILOT ROSEMOUNT 1221F(FUSELAGE)
175-219		SPARE
220		Checksum for this second

### 3. Start Date

20040301

### 4. Stop Date

20030314

### 5. Coverage

- a. Southernmost Latitude: 10 N (or S)
- b. Northernmost Latitude: 45 N (or S)

- c. Westernmost Longitude: -170 W (or E)
- d. Easternmost Longitude: -078 W (or E)

## **6. How to Order Data**

Ask NCDC's Climate Services about costs of obtaining this dataset.

Phone 828-271-4800

Fax 828-271-4876

e-mail- [orders@ncdc.noaa.gov](mailto:orders@ncdc.noaa.gov)

## **7. Archiving Data Centers**

Name : National Climatic Data Center/NCDC

Address: Federal Building

151 Patton Ave.

Asheville, NC 28801-5001

Voice Telephone: 828-271-4800

Name: Aircraft Operations Center

Address: Science and Engineering Division

P.O. Box 6829

Macdill AFB, FL 33608-0829

Voice Telephone: 813-828-3310

Fax: 813-828-5061

## **8. Technical Contact**

Flight Director's Name: Martin Mayeaux

Address: Aircraft Operations Center

P.O. Box 6828

Macdill AFB, FL 33608-0829

Voice Telephone: 813-828-3310 x 3086

Fax: 813-828-5061

## **9. Known Uncorrected Problems:**

None

## **10. Quality Statement:**

Disclaimer: This data is the raw flight-level weather data that has not been quality controlled for sensor contamination or other instrument related errors.

## **11. References:**

Merceret, F.J., and Davis, H.W., 1981: The Determination of Navigational and Meteorological Variables Measured by NOAA/RFC WP3D Aircraft.